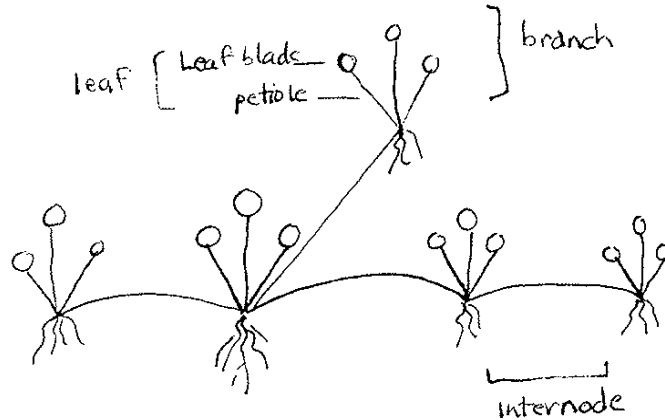


Plant Foraging: Two Case Studies

Case Study #1 - Growth Pattern in Clonal Plants

The growth patterns of some plants, especially vines and plants with stolons (runners), is analogous to the foraging tactics of animals. Consider a plant such as Ground ivy which is also called Creeping Charlie (*Glechoma hederacea*). A 'parental' plant can send out runners (or stolons) which will form a new individual that is a "genetic carbon copy" or clone of the parent. We can diagram the growth of these plants as follows:



Now, let's make some predictions concerning the clonal growth of ground ivy under favorable (adequate light & nutrients) and unfavorable conditions (*Do not look at Table 1 or Table 2 until you complete your predictions*). For each hypothesis, circle your prediction and then complete the statement with your rationale. After you have formulated all of your hypotheses, examine the data at the end. In the 'Experimental Results' section, briefly summarize the data that address the hypothesis. Then, evaluate your hypothesis (reject or support).

Hypothesis 1: *Under favorable growth conditions, clonal plants like ground ivy will produce (fewer / more) branches because.....*

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Hypothesis 2: *Under favorable growth conditions, clonal plants like ground ivy will have (shorter / longer) internodes because....*

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Hypothesis 3: *Under favorable growth conditions, clonal plants like ground ivy will produce (fewer / more) individuals per clone because....*

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Hypothesis 4: Under favorable growth conditions, clonal plants like ground ivy will have (smaller / larger) leaves because.....

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Hypothesis 5: Under favorable growth conditions, clonal plants like ground ivy will have (fewer / more) leaves because.....

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Hypothesis 6: Under favorable growth conditions, clonal plants like ground ivy will have (shorter / longer) petioles because.

Experimental Results:

Conclusion: The hypothesis is: rejected / supported

Table 1. Foraging in Ground Ivy (*Glechoma hederacea*). Data from Hutchins and Slade; *Plants Today* Jan-Feb, 1988.

Treatment	Stolon Branches	Stolon length (cm)	Individuals/clone
hi light/hi nutrients	37	6.4	110
hi light/low nutrients	22	7.0	62
low light/hi nutrients	5	10	23

Table 2. Foraging response in clonal plants. Data from Tooley - *Journal of Biological Education* 23: 263 (1989)

Light Intensity (lux)	Petiole Length (% initial)	leaf number (% initial)	Stolon length (cm)	Leaf surface area (% initial)
400	28	30	18	7.8
2000	132	219	13.3	122.7

Case Study #2: Vines

Ray (1975) found that *Syngonium* vines in rain forests were of two types: (1) Long stem/small leaves - the traveling form; and (2) short stem/large leaves - the feeding form. Under what conditions do you predict to find each of the two forms?